

Fig. 1  
(prior Art)

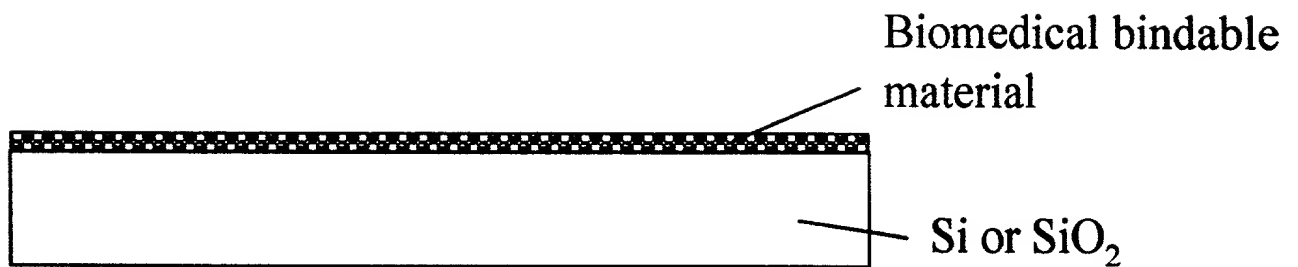


Fig. 2A-1 (prior Art)

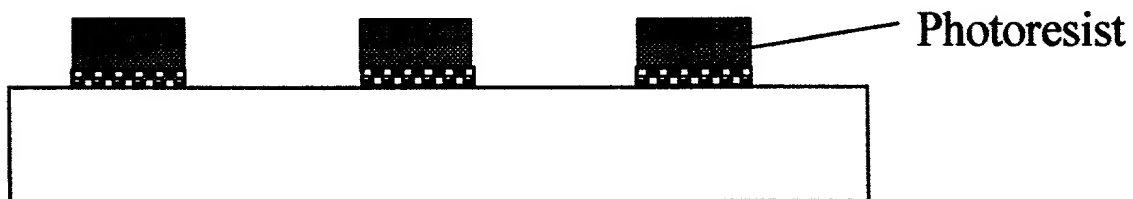


Fig. 2A-2 (Prior Art)

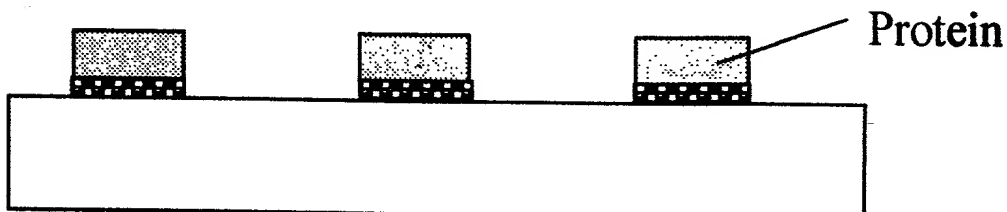


Fig. 2A-3 (prior Art)

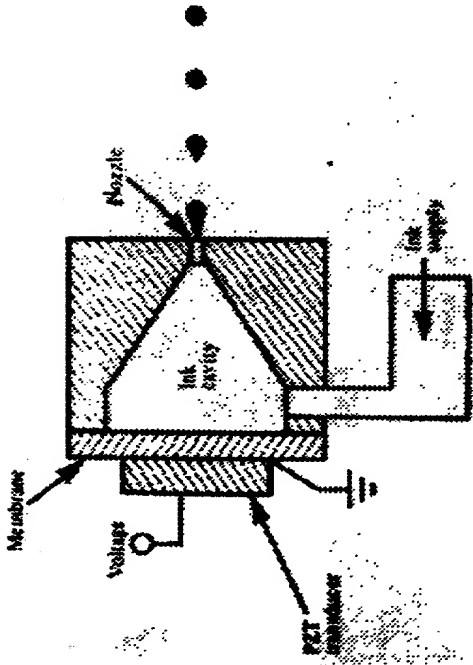


Fig. 2B-1 (prior art)

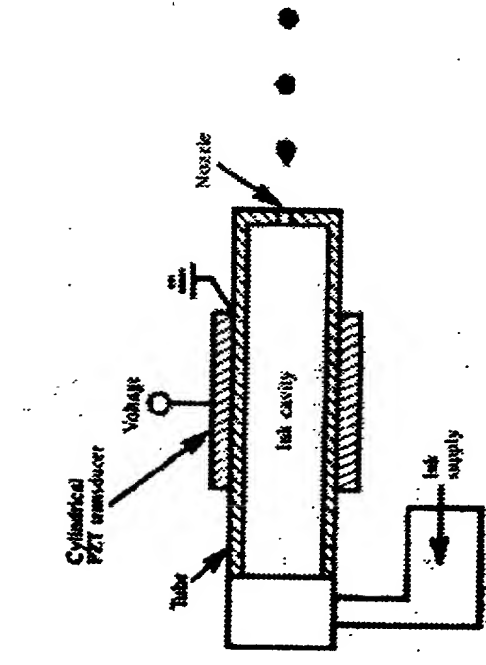


Fig. 2B-2 (prior art)

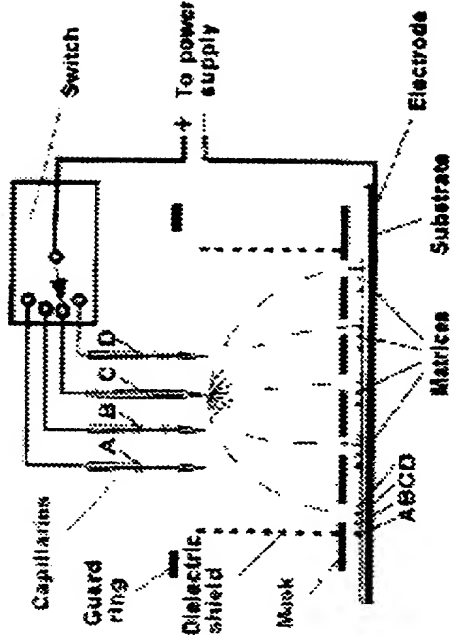


Fig. 2B-3 (prior art)

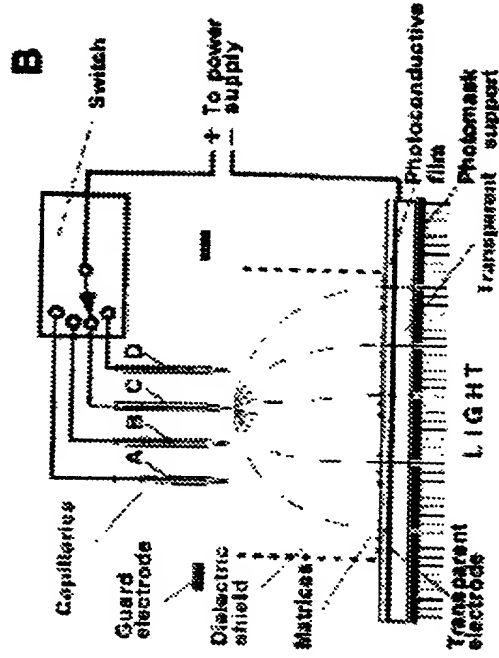


Fig. 2B-4 (prior art)



Fig. 2D-a (prior Art)

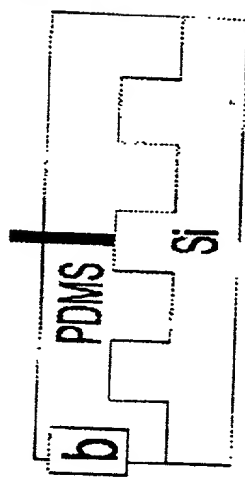
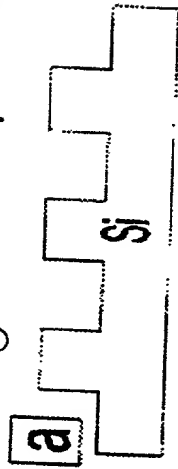


Fig. 2D-b (prior Art)

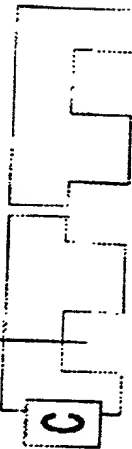


Fig. 2D-c (prior Art)

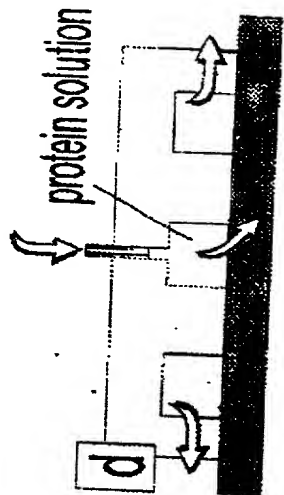


Fig. 2D-d (prior Art)

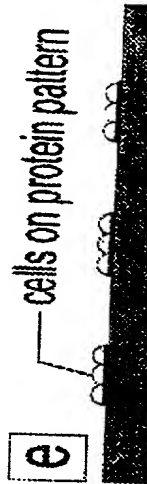


Fig. 2D-e (prior Art)

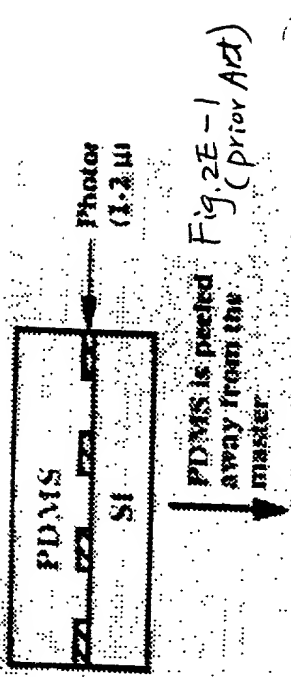


Fig. 2E-1 (prior Art)

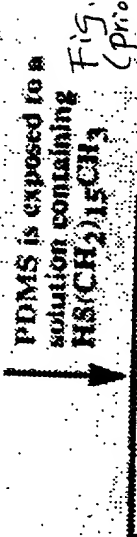


Fig. 2E-2 (prior Art)

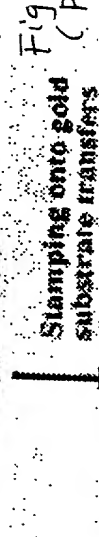


Fig. 2E-3 (prior Art)



Fig. 2E-4 (prior Art)



Fig. 2E-5 (prior Art)



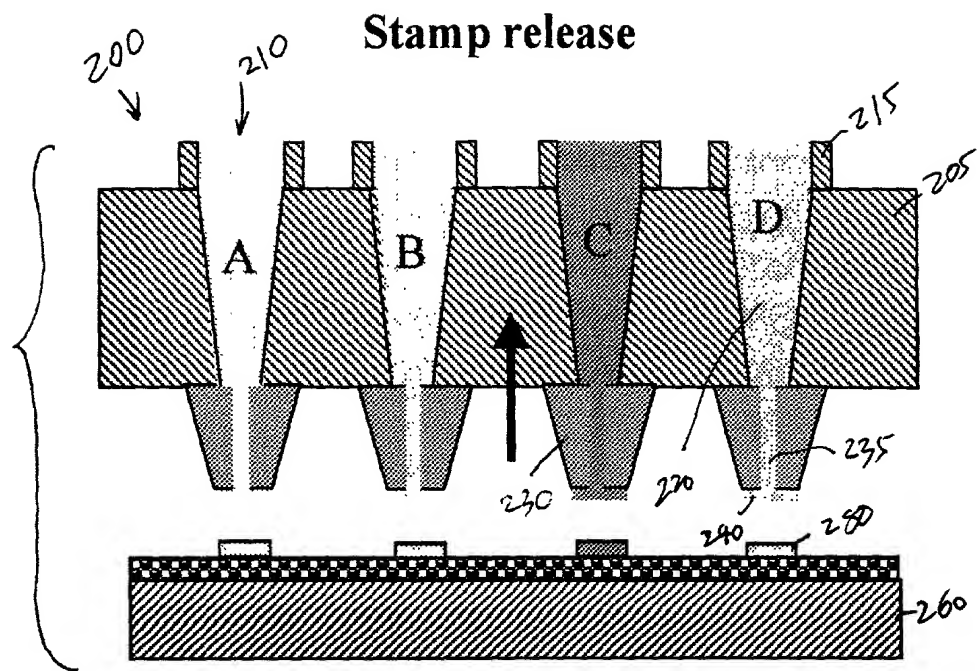


Fig. 5

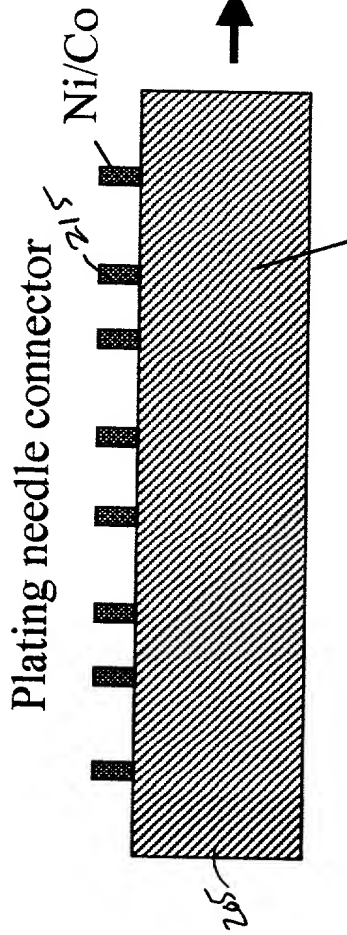


Fig. 6A

Molding Silicone rubber Stamp

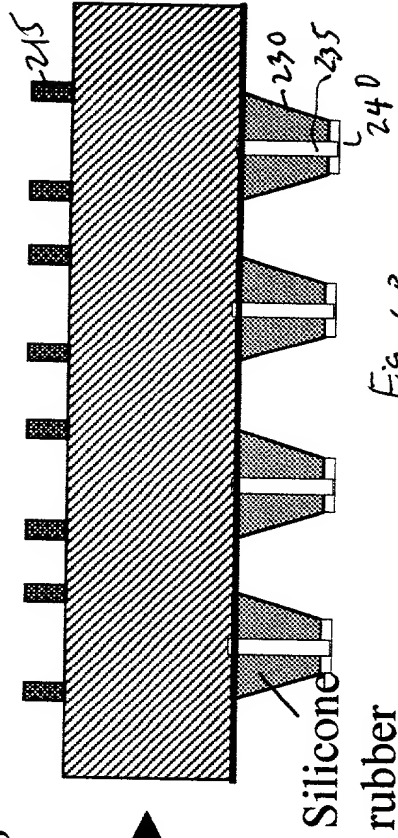


Fig. 6B

Remove silicone rubber residue to open channel/stamp connection

Deep RIE/wet etching fluid channel

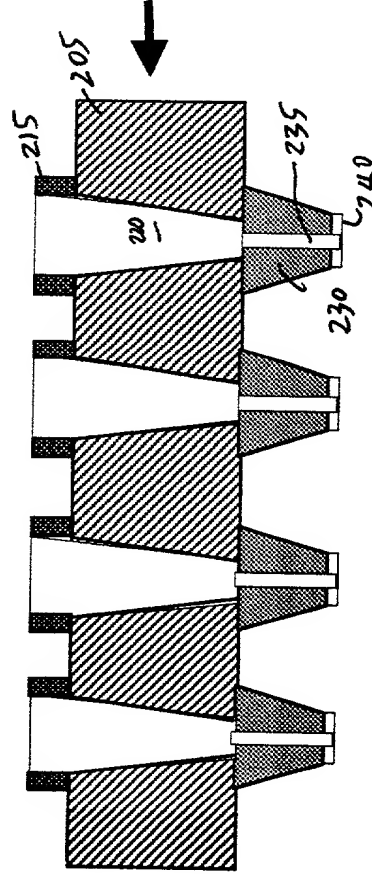


Fig. 6D

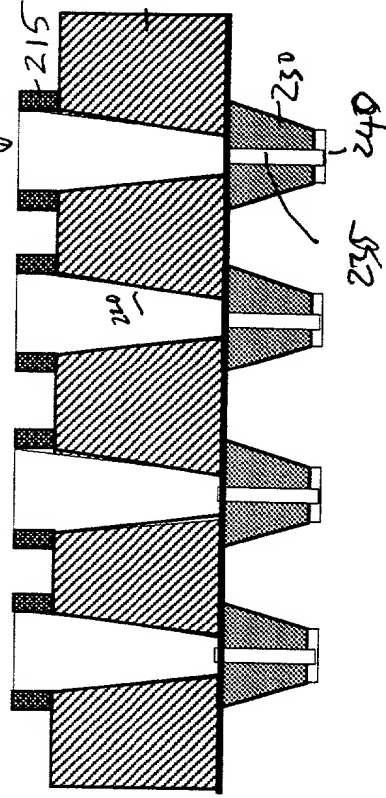


Fig. 6C

Wet etching Glass substrate  
To make primary and micro channel

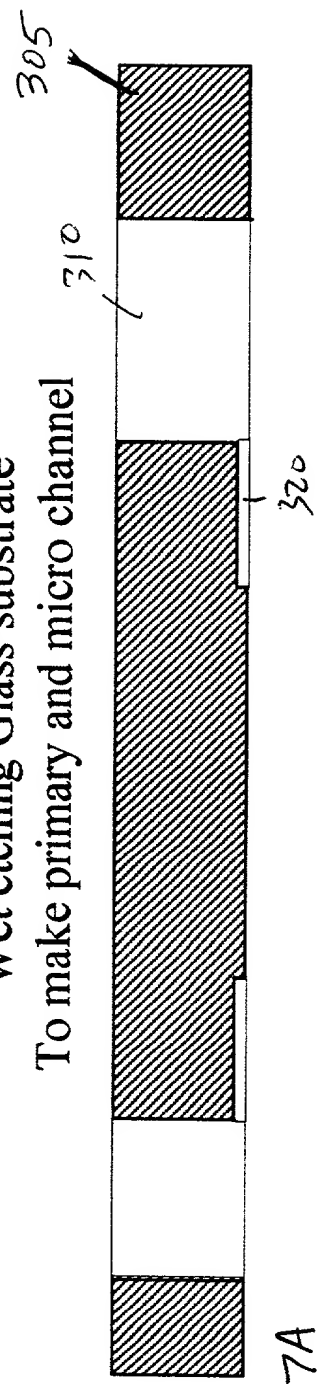


Fig. 7A

Silicone rubber molding silicon substrate  
Deep RIE secondary reservoir

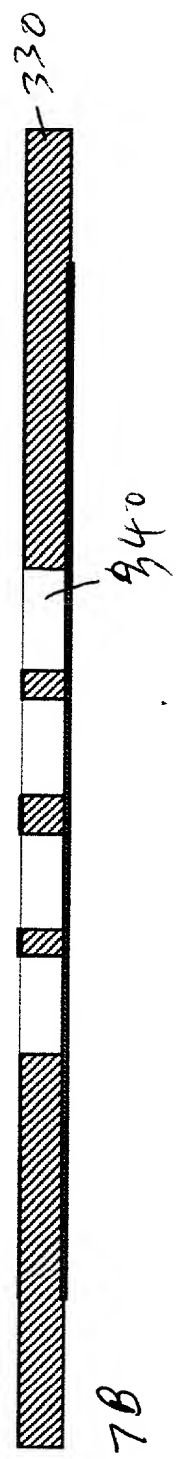


Fig. 7B

Wafer bonding

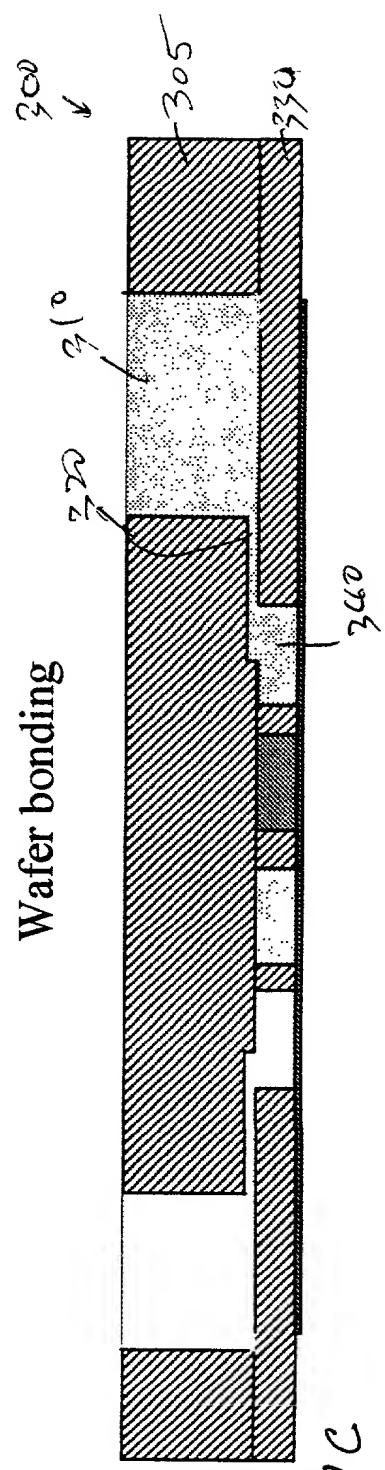


Fig. 7C



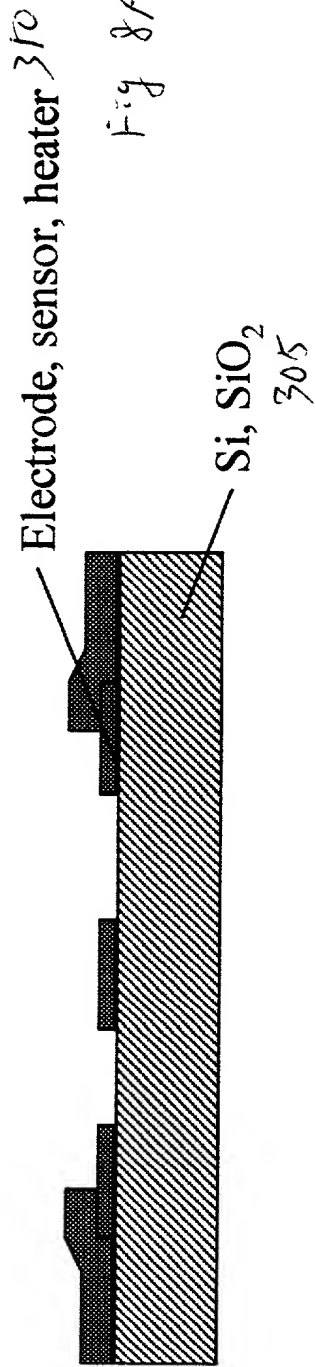


Fig. 8A

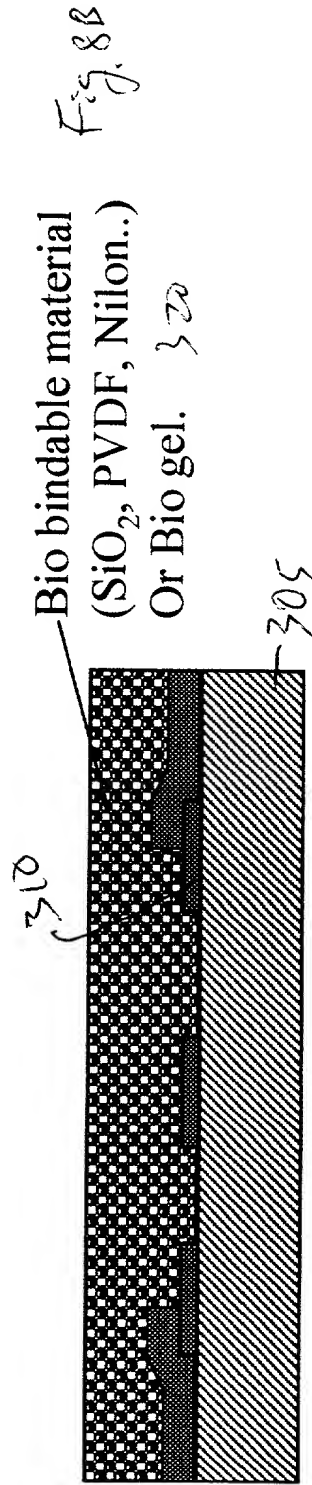
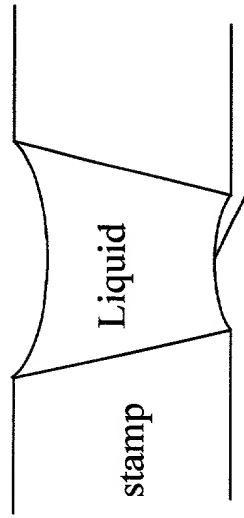


Fig. 8B

## New design concepts

### A. Liquid filling into stamp

- (1) hydrophilic surface inside channel (easy to fill in, but the bottom meniscus of liquid is concave upward which is not desired)



Not easy to contact with reaction substrate

Fig. 9A

- (3) hybrid surface inside channel

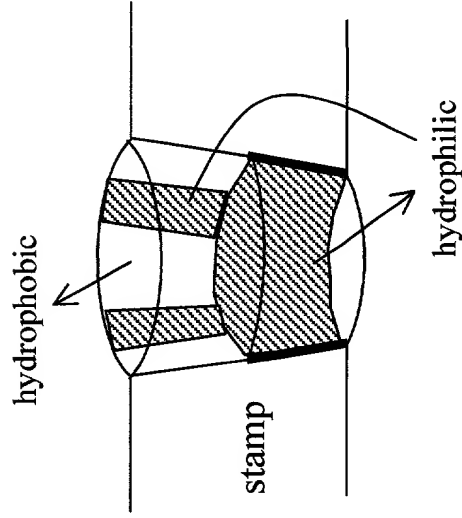
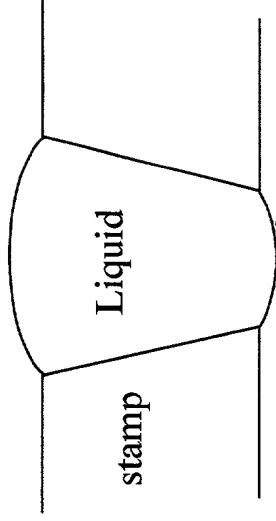


Fig. 9C

- (2) hydrophobic surface inside channel (liquid hard to fill in, however, the bottom meniscus of liquid is what we need; concave downward)



Easy to contact with reaction substrate

Fig. 9B

- partial hydrophilic and hydrophobic surface as the left side; or the surface can be switched into hydrophilic or hydrophobic as desired

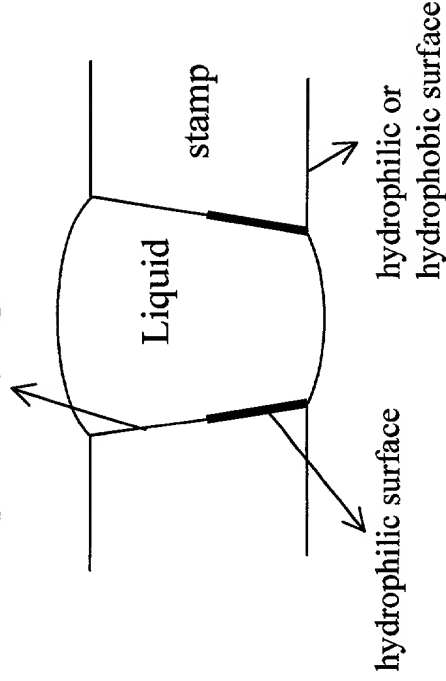
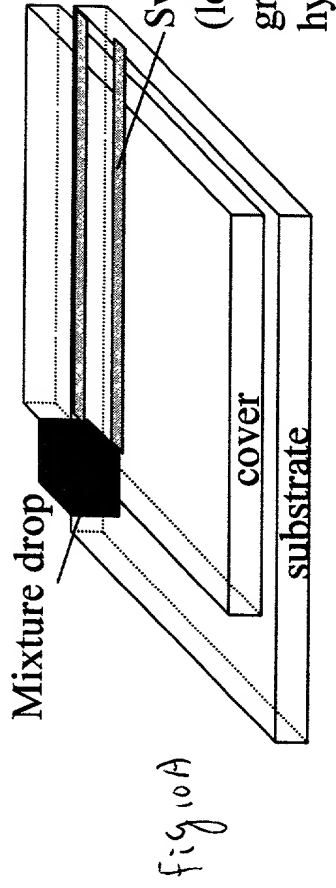


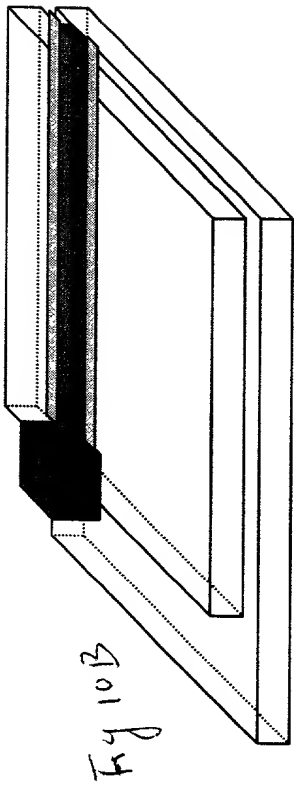
Fig. 9D

# New idea: 2 D micro Separation

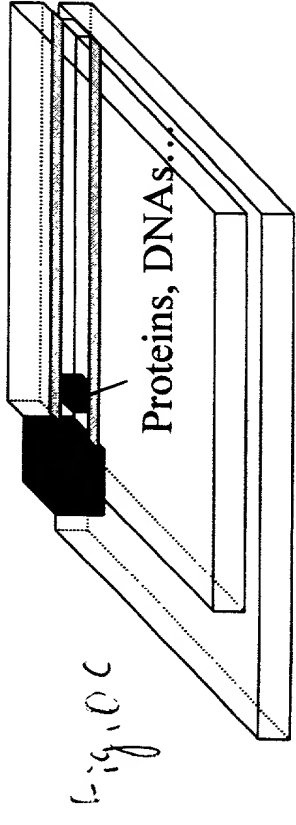
(a) Blood or bio-reagent mixture drop



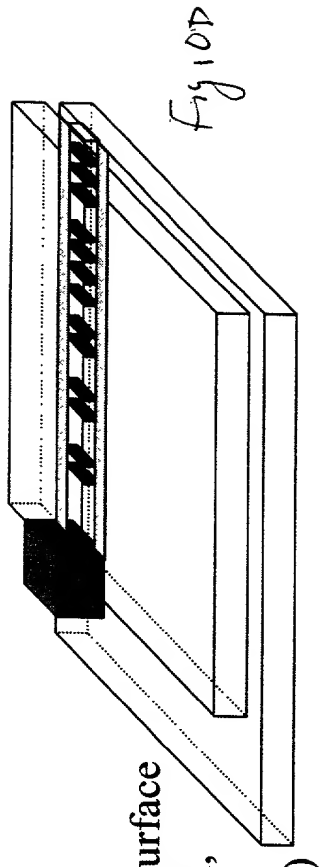
(b) Liquid mixture fill in by surface tension



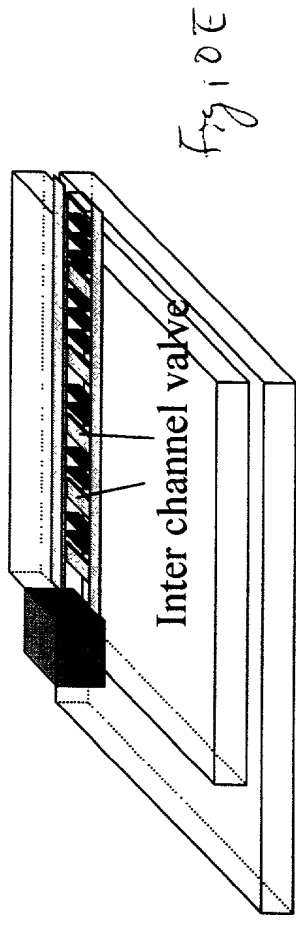
(c) Proteins, DNA, or bio-reagent focus



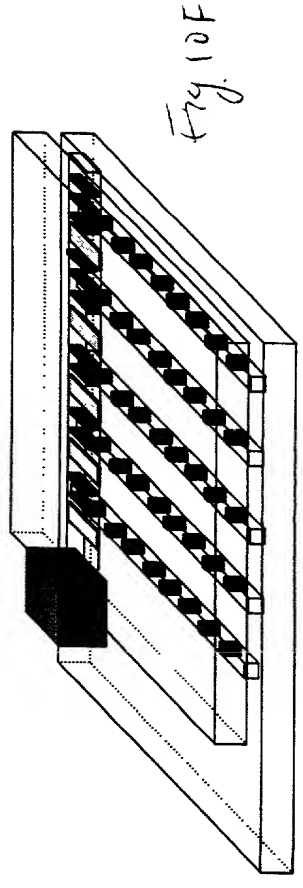
(d) Proteins, DNA... coarse separation by capillary electrophoresis



(e) Mixture droplet separation



(f) Liquid fill into vertical channels and Fine separation by capillary electrophoresis



Micro protein arrays  
on chip surface

(a). Dry off and take  
out the cover

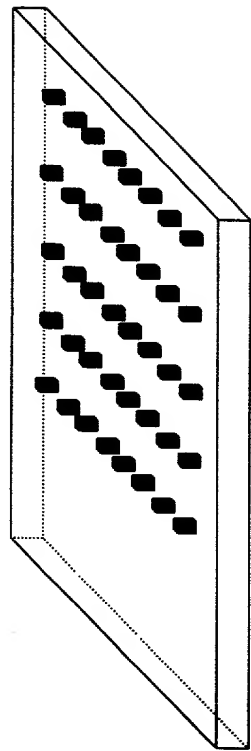


Fig 11 B

For direct analysis

Micro protein arrays  
inside micro chambers

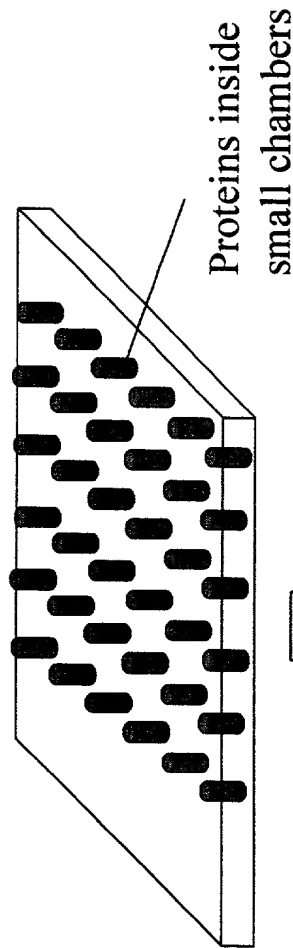
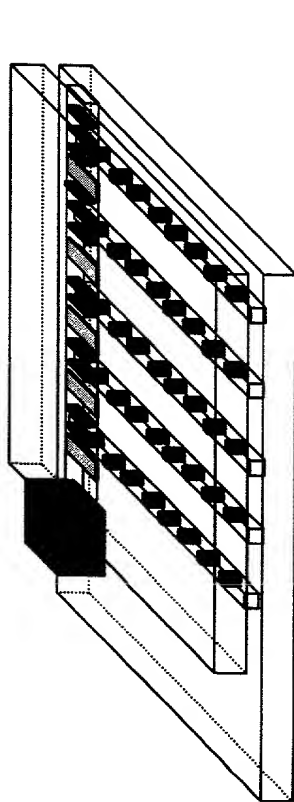


Fig 11 C

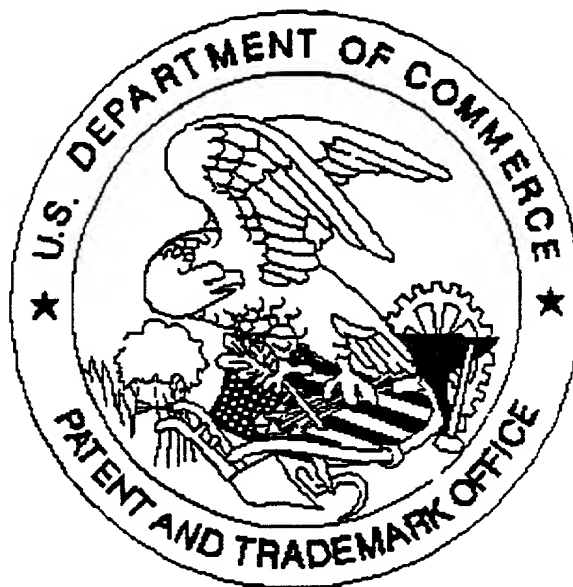
Directly connected to micro stamp  
for microfilling process  
(pitch is exactly the same as on the stamp)

Fig 11 A



(b). Suck into  
micro chambers

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